REMARKS

This paper responds to the Office Action mailed December 5 2003.

With regard to the objections to the drawings, new pages 1 and 6 of the drawings accompany this response. Figures 1 and 2 are labelled as prior art, and a box "control" has been added to Figure 7 which provides the "$V_{VARIABLE}$" decision threshold.

The amendment to the specification is to correct an error. The correct formula appears in Figure 1.

In response to the informality objection to claim 17, the claim has been cancelled.

Claims 1, 4, 9 and 14 relate to an apparatus and method of determining an error ratio, and a node and network using this apparatus. The apparatus measures an error ratio for each channel in sequence using a predetermined decision threshold. This threshold is then changed between successive cycles.

The measurement of an error ratio using one decision threshold may be considered to be a <u>partial</u> measurement for obtaining the channel error ratio, as data is needed for multiple decision thresholds in order to determine the error ratio for the actual decision threshold used by receiving circuitry. With reference to Figure 4A (for example) each point 40, 44, 52, 48 is an error ratio measurement for one decision threshold. The error ratio for the channel is defined by the apex of the plot in Figure 4A and is obtained by extrapolating from the points 40, 44, 52, 48.

To clarify this, claims 1, 4, 9 and 14 have been amended to require the measured error ratios for each channel using different decision thresholds to be combined to determine a channel error ratio.

Thus, amended claims 1, 4, 9 and 14 now require a partial error measurement operation to be carried out on each channel in sequence. As explained clearly in the detailed description, this enables each channel to be visited more frequently. In particular, an individual error ratio measurement at one decision threshold can be used to provide an alarm indication, even though it cannot alone provide a channel error ratio or Q-factor measurement for the channel.

The main reference cited against claims 1, 4, 9 and 14 is "Ransford" (US 6 532 087). Claims 1 and 4 have been rejected under 35 USC 102(e) as being anticipated by Ransford, and Claims 9 and 14 have been rejected under 35 USC 103(a) as being unpatentable over Ransford in view of "Chaudhuri" (US 6 587 235).

Ransford discloses a method of performing a full Q-factor measurement for a number of channels in sequence. Thus, Ransford operates in the manner explained at page 3 lines 19-27 of the instant application. Ransford is concerned with implementing a system which can measure Q factor rapidly and fully for one channel, and makes no disclosure or suggestion of interleaving the measurements for different channels.

Chaudhuri has been cited to show a network and node architecture, and gives no further teaching relevant to the implementation of bit error measurement or Q-factor measurement for multiple channels.

It is therefore submitted that amended claims 1, 4, 9 and 14 are new and not anticipated by or rendered obvious by the prior art.

Claim 18 is directed to an optical communications network in which nodes of the network are provided with Q-factor measurement circuits, and optical amplifiers <u>between the nodes</u> are provided with optical spectrum analysis apparatus. As

described at the top of page 10, the spectrum analysis in the amplifier sites can obtain channel power and inter-channel noise information, whereas the Q-factor measurement gives optical eye closure information. Thus, the network can detect a large number of types of fault, as mentioned at page 5 lines 19-22.

Claim 18 has been rejected under 35 USC 103(a) as being unpatentable over Ransford in view of Chaudhuri.

Ransford does disclose an amplifier as part of the Q-factor measurement circuitry. However, the microprocessor does not carry out optical spectrum analysis, but instead controls the Q-factor measurement operation. There is no disclosure or suggestion in Ransford of optical spectrum analysis associated with an amplifier between nodes. Chaudhuri also fails to disclose optical amplifiers between nodes, and fails to disclose or suggest the combination of optical spectrum analysis at intermediate amplifier sites with Q-factor measurement at node sites.

It is therefore submitted that claim 18 is new and not anticipated by or obvious over the prior art in its original form.

Claims 19 – 25 are cancelled by this amendment.

Detailed arguments are not presented in respect of the dependent claims. However, the arguments of the Examiner should not be taken to be accepted.

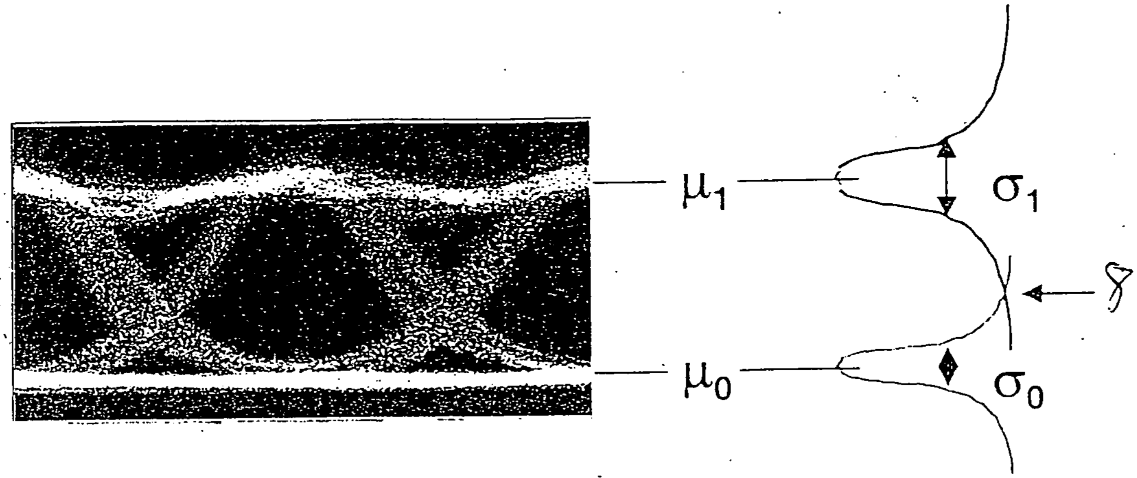
In view of the arguments above, the applicants submit that this application is in order for allowance. Such action is therefore solicited.

March 3, 2004

Respectfully submitted,

William M. Lee

William M. Lee, Jr.
Registration No. 26,935
Barnes & Thornburg
P.O. Box 2786
Chicago, Illinois 60690-2786
(312) 214-4800
(312) 759-5646 (fax)



$$Q = \frac{\mu_1 - \mu_0}{\sigma_1 + \sigma_0}$$

$$\mathrm{BER} = \frac{1}{2} erfc\left(\frac{Q}{\sqrt{2}}\right)$$

FIG 1 PRIOR ART

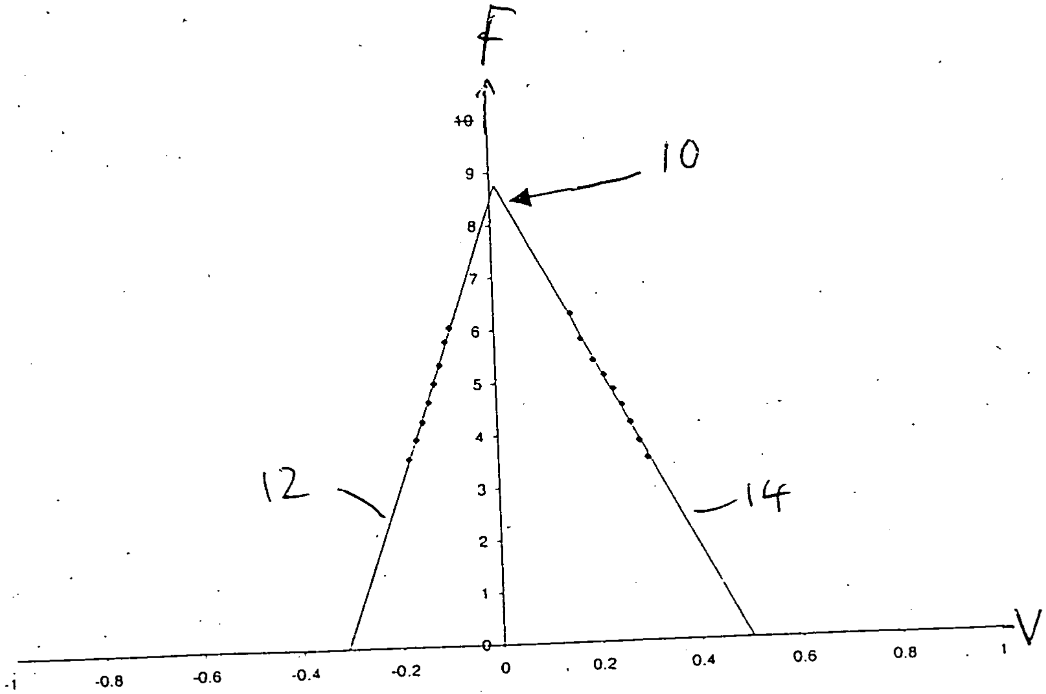


FIG 2 PRIOR ART

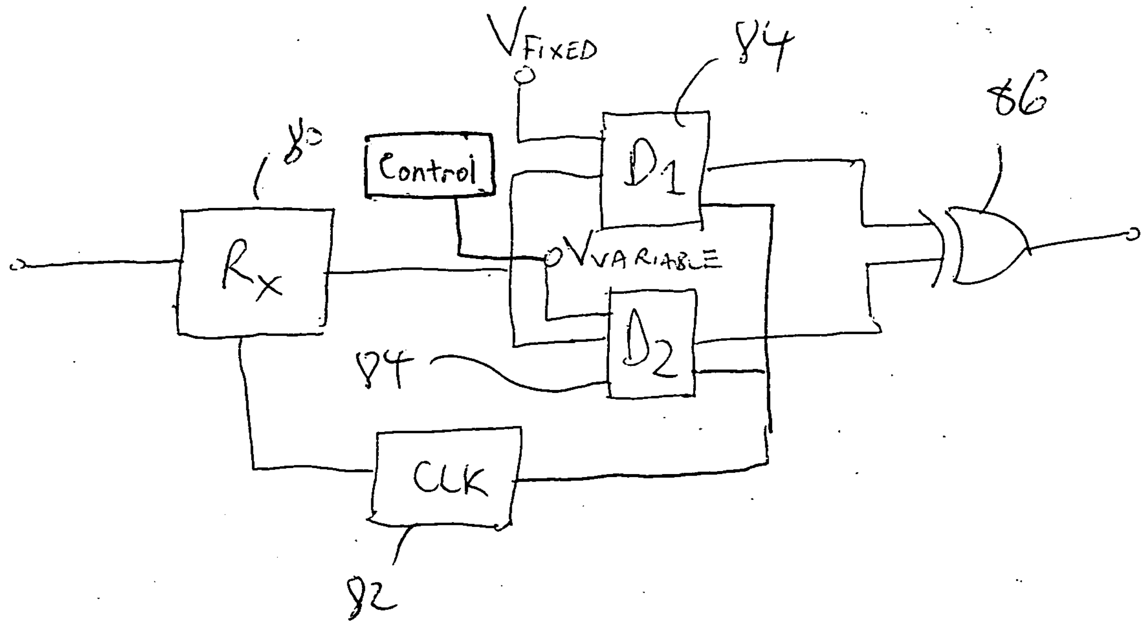


FIG 7